

WHAT IS CLAIMED IS:

Sub A!
GAK
2-4-03

1. A method for producing a foamed article by first making modified polyester resin pellets having increased swell of 5 to 200% and JIS melt flow rate (MFR) of not more than 50 g/10 minutes measured at 280°C by preliminary heating ^{of} a mixture comprising (a) 100 parts by weight of linear saturated polyester, (b) 0.1 to 10 parts by weight of a mixture as a coupling agent of 0 to 100% by weight of a compound having two epoxy groups in the molecule, and 100 to 0% by weight of a compound having more than two epoxy groups, and (c) 0.01 to 5 parts by weight of a metal salt of a carboxylic acid as a coupling reaction catalyst to a temperature greater than the melting point of said polyester, and secondly heat foaming said modified polyester resin using a foaming agent.

2. A method for producing a foamed article comprising; heating in an extruder a mixture comprising (a) 100 parts by weight of a linear saturated polyester, (b) 0.1 to 10 parts by weight of a mixture as a coupling agent of 0 to 100% by weight of a compound having two epoxy groups in the molecule and 100 to 0% by weight of a compound having more than two epoxy groups, and (c) 0.01 to 5 parts by weight of a metal salt of a carboxylic acid as a coupling reaction catalyst,

to a temperature greater than the melting point of said polyester to make a modified polyester resin having increased molecular weight, melt viscosity and swell; injecting a foaming agent into said modified polyester resin in said extruder; and heat foaming the modified polyester resin.

3. The method for producing a foamed article as claimed in claim 1 or 2, wherein the foaming agent is a volatile foaming agent.

4. The method for producing a foamed article as claimed in claim 3, wherein the volatile foaming agent is an inert gas.

5. The method for producing a foamed article as claimed in claim 4, wherein the inert gas is carbon dioxide gas or nitrogen gas.

6. The method for producing a foamed article as claimed in claim 1 or 2, wherein the foaming agent is a heat decomposable foaming agent.

7. The method for producing a foamed article as claimed in any one of claims 1 to 6, wherein the foamed

09787627 032101

article has an expansion ratio of 1.2 to 100.

8. The method for producing a foamed article as claimed in any one of claims 1 to 8, wherein the linear saturated polyester is polyethylene terephthalate-based aromatic polyester having an intrinsic viscosity of 0.50 to 0.90 dl/g.

9. The method for producing a foamed article as claimed in any one of claims 1 to 8, wherein the linear saturated polyester is a recycled product of a recovered polyethylene terephthalate-based aromatic polyester molded product.

10. The method for producing a foamed article as claimed in any one of claims 1 to 9, wherein the compound having two epoxy groups in the molecule as the coupling agent contains at least one or more selected from the group consisting of aliphatic polyethylene glycol diglycidyl ether, alicyclic hydrogenated bisphenol A diglycidyl ether, aromatic bisphenol A diglycidyl ether, and bisphenol A diglycidyl ether initial condensate.

11. The method for producing a foamed article as claimed in any one of claims 1 to 9, wherein the compound

09787627 032101

having more than two epoxy groups in the molecule as the coupling agent contains at least one or more selected from the group consisting of aliphatic trimethylolpropane triglycidyl ether, glycerin triglycidyl ether, heterocyclic triglycidyl isocyanulate, aromatic phenol novolac epoxy resin, cresol novolac epoxy resin, and bisresorcinol tetraglycidyl ether.

12. The method for producing a foamed article as claimed in any one of claims 1 to 11, wherein a polyethylene terephthalate-based aromatic polyester is used, which is obtained by chain reacting a linear saturated polyester prepolymer having an intrinsic viscosity of 0.50 to 0.90 dl/g via an ester bond having a by-product hydroxyl group, and has a branched long chain.

Sub A² 13. A method for producing a foamed article comprising; heating in an extruder a mixture comprising (a) 100 parts by weight of an undried linear saturated polyester melted at a temperature above the melting point thereof, and deaerated to less than -600 mmHg, (b) 0.1 to 10 parts by weight of a mixture as a coupling agent of 0 to 100% by weight of a compound having two epoxy groups in the molecule and 100 to 0% by weight of a compound having more than two epoxy groups, and (c) 0.01 to 5 parts by weight of a metal salt of a

carboxylic acid as a coupling reaction catalyst to a temperature greater than the melting point of said polyester to make a modified polyester resin having increased swell of 5 to 200% and JIS melt flow rate (MFR) of not more than 50 g/10 minutes measured at 280°C; injecting a foaming agent into said modified polyester resin in said extruder wherein the foaming agent is dissolved in the modified polyester resin under pressure and cooling; and releasing the modified polyester resin into the atmosphere through a die of said extruder.

14. A polyester foamed article as claimed in claim 13, which is obtained by increasing the molecular weight of the polyester resin to an MFR of not more than 50 g/10 minutes via an ester bond using a coupling agent having at least two epoxy groups in the molecule; the polyester foamed article having a swell value of 5 to 200% upon measurement of MFR and an expansion ratio of 1.2 to 100.

0978767.032404